Egg survival strategies of the Senegalese grasshopper during the dry season in the African Sahel.

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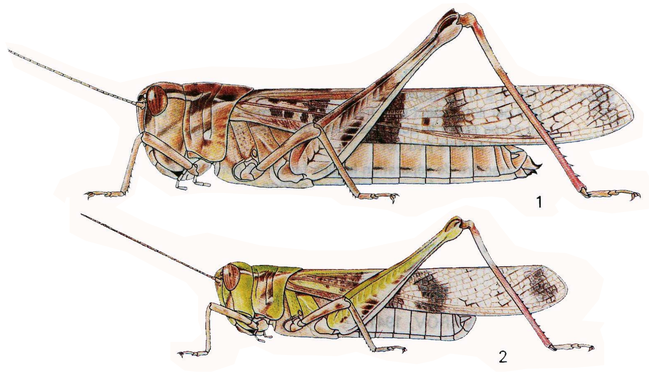
Adult of *Oedaleus senegalensis* Krauss, 1877

The Senegalese grasshopper is an important pest for the Sahelian crops in Africa. It develops 3 generations per year and undergoes an embryonic diapause during the long dry season that can last up to 7-8 months.



The Senegalese grasshopper (1, female; 2, male).

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Method

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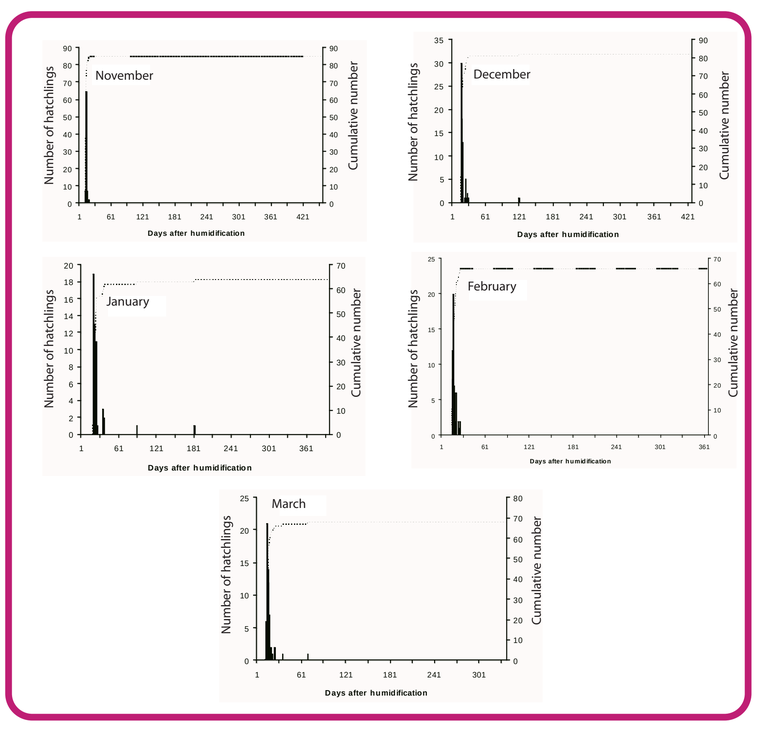
Typical environment of the Senegalese grasshopper in Niger (Zinder area)

(top: dry season ; bottom : rainy season)

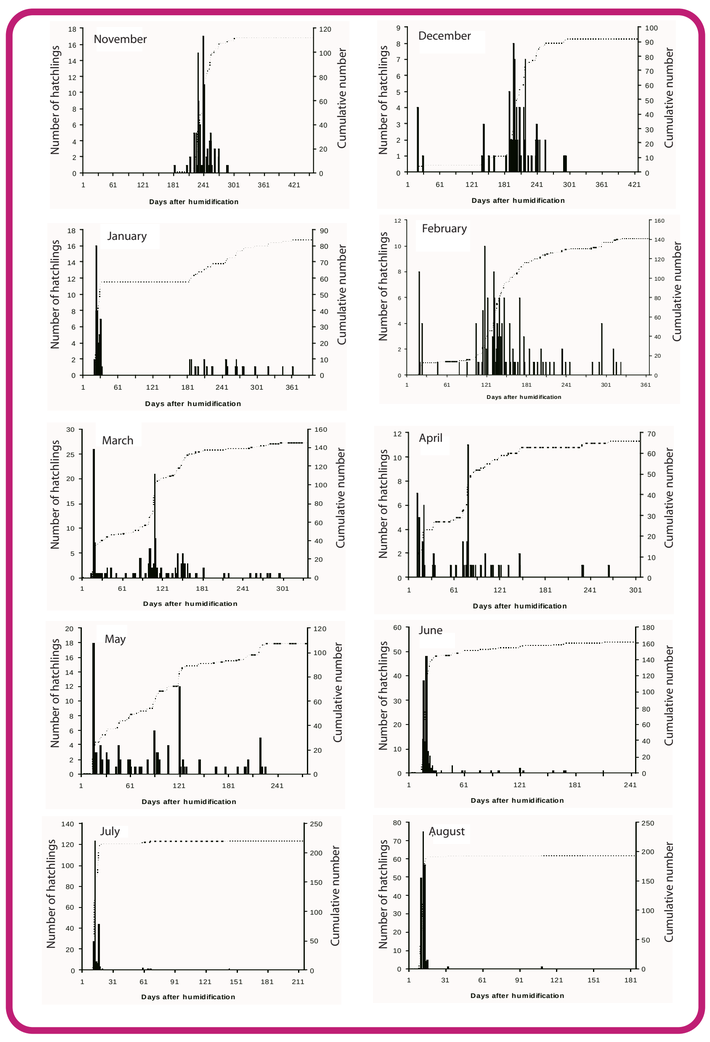
In order to specify our knowledge on this diapause (induction, elimination, survival capacities of the eggs) we carried out an experiment in semi-natural conditions. Egg-pods, collected at the end of the rainy season, from mid-August to the end of September (period for diapause induction), were placed in incubation and humidified on various dates from November to August of the following year.

Results

Results show that the survival strategy of the Senegalese grasshopper during the dry season is more complex than previously supposed and does not rely merely on a simple embryonic diapause. The strategy combines several components :



Hatchlings of eggs laid in August (without diapause) and humificated during the dry season between 1st November and 1st March.



Hatchlings of eggs laid late September (with diapause) and humificated during the dry season between 1st November and 1st August of the following year.

✔ The embryonic diapause during the dry season allows a global adaptation to the regular seasonal variation in rainfall.

The other components constitute the adaptations of the species to the various risks related to different irregularities in rainfall pattern especially in the Sahel.

✔ The high number of hatchlings within a short period of time at the end of the rainy season, for egg-pods laid before the end of August and without diapause, allowed an adaptation to the frequently abrupt end of rainfall.

✔ The possibility of embryonic quiescence can allow the eggs to survive for up to one year without diapause and constitutes an adaptation to a reduced rainy season (end before diapause induction).

✔ Lastly, the staggering of hatchlings for diapausing eggs over a lengthy period at the beginning of the rainy season, constitutes an adaptation to the progressive set in of the rains and to frequent long interspersed periods of drought following the first rains that trigger hatchlings.

Finaly, the Senegalese grasshopper developed a bet-hedging strategy which does not seem besides to be too much "expensive" because nonassociated with a reduction in the hatchling rate. Such a strategy fits particularly well to the sahelian environment and makes it possible to maximize the chances of eggs'survival.

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